

1. Record Nr.	UNINA9910455442103321
Titolo	Advances in diagnostic and therapeutic ultrasound imaging // Jajit S. Suri [and others], editors
Pubbl/distr/stampa	Boston ; , : Artech House, , ©2008 [Piscataway, New Jersey] : , : IEEE Xplore, , [2008]
ISBN	1-59693-145-0
Descrizione fisica	1 online resource (448 p.)
Collana	Artech House bioinformatics & biomedical imaging series
Altri autori (Persone)	SuriJasjit S
Disciplina	616.07/543
Soggetti	Ultrasonic imaging Diagnostic ultrasonic imaging Ultrasonic waves - Therapeutic use Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Advances in Diagnostic and Therapeutic Ultrasound Imaging; Contents; Preface; Part I Recent Advances in Ultrasound Instrumentation; Chapter 1 3-D Ultrasound Imaging; 1.1 Introduction; 1.2 Disadvantages of 2-D Ultrasound; 1.3 3-D Ultrasound Scanning Techniques; 1.4 Mechanical Scanning; 1.4.1 Linear Mechanical 3-D Scanners; 1.4.2 Tilt 3-D Mechanical Scanners; 1.4.3 Endocavity Rotational 3-D Scanners; 1.5 Free-Hand Scanning with Position Sensing; 1.5.1 Tracked 3-D US with Articulated Arm Sensing; 1.5.2 Free-Hand 3-D US with Acoustic Tracking. 1.5.3 Free-Hand 3-D Scanning with Magnetic Field Sensing 1.5.4 3-D US Tracked by Speckle Decorrelation; 1.6 Free-Hand 3-D US Scanning Without Position Sensing; 1.7 2-D Array Scanning for Dynamic 3-D Ultrasound (4-D US); 1.8 3-D Ultrasound Visualization; 1.8.1 Multiplanar Reformating; 1.8.2 Volume Rendering Techniques; 1.9 3-D Ultrasound-Guided Prostate Therapy; 1.9.1 Early-Stage Prostate Cancer Management; 1.9.2 US-Guided Prostate Brachytherapy; 1.9.3 3-D TRUS-Guided Brachytherapy System; 1.9.4 3-D TRUS Imaging System; 1.9.5 Prostate Segmentation; 1.9.5.1 Initialization; 1.9.5.2 Refinement. 1.9.5.3 Propagation 1.9.6 Dosimetry; 1.9.7 Calibration of the

Coordinate Systems; 1.9.8 Needle Segmentation; 1.10 Evaluation of 3-D TRUS-Guided Brachytherapy System; 1.10.1 Methods of Calibration; 1.10.1.1 Fiducial Localization Error; 1.10.1.2 Fiducial Registration Error; 1.10.1.3 Target Registration Error; 1.10.2 Results of Calibration; 1.10.3 Accuracy of Needle Placement; 1.10.4 Accuracy of Needle Angulation; 1.10.5 Accuracy of Needle Targeting; 1.10.6 Accuracy of Needle Tracking; 1.10.7 Accuracy of Seed Implantation; 1.11 Conclusions; Acknowledgments; References.

Chapter 2 Despeckle Filtering in Ultrasound Imaging of the Carotid Artery  
2.1 Introduction; 2.2 Despeckle Filtering; 2.2.1 Local Statistics Filtering; 2.2.1.1 First-Order Statistics Filtering (ismv, wiener); 2.2.1.2 Homogeneous Mask Area Filtering (sminsc); 2.2.2 Median Filtering (median); 2.2.3 Maximum Homogeneity over a Pixel Neighborhood Filtering (homog); 2.2.4 Geometric Filtering (gf4d); 2.2.5 Homomorphic Filtering (homo); 2.2.6 Diffusion Filtering; 2.2.7 Wavelet Filtering (waveltc); 2.3 Methodology; 2.3.1 Material; 2.3.2 Recording of Ultrasound Images; 2.3.3 Despeckle Filtering.  
2.3.4 Texture Analysis  
2.3.4.1 Statistical Features (SF); 2.3.4.2 Spatial Gray-Level Dependence Matrices (SGLDMs); 2.3.4.3 Gray Level Difference Statistics (GLDS) [44]; 2.3.4.4 Neighborhood Gray Tone Difference Matrix (NGTDM) [45]; 2.3.4.5 Statistical Feature Matrix (SFM) [46]; 2.3.4.6 Laws Texture Energy Measures (TEM) [46]; 2.3.4.7 Fractal Dimension Texture Analysis (FDTA) [46]; 2.3.4.8 Fourier Power Spectrum (FPS) [46]; 2.3.5 Distance Measures; 2.3.6 Univariate Statistical Analysis; 2.3.7 kNN Classifier; 2.3.8 Image Quality Evaluation Metrics; 2.3.9 Visual Evaluation by Experts; 2.4 Results.

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## Sommario/riassunto

This groundbreaking resource offers you exclusive coverage of the latest techniques in diagnostic and therapeutic 3-D ultrasound imaging instrumentation and techniques. Providing a solid overview of potential applications in clinical practice, you find need-to-know details on major diseases, including vascular diseases, breast cancer, cardiac abnormalities and prostate cancer.

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